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Battery Acid Chemical Found on Jupiter's Moon Europa

Sulfuric acid — a corrosive chemical found on Earth in car batteries — exists on the frozen surface of Jupiter's icy moon Europa.

"This demonstrates once again that Europa is a really bizarre place," said Dr. Robert Carlson of NASA's Jet Propulsion Laboratory. "Sulfuric acid occurs in nature, but it isn't plentiful. You're not likely to find sulfuric acid on Earth's beaches, but on Europa, it covers large portions of the surface."

Although there is no evidence of life on Europa, pictures and other scientific information gathered by the Galileo spacecraft indicate a liquid ocean may lie beneath Europa's icy crust. Water is one key ingredient essential for life.

At first, Carlson thought the spectrometer's findings of sulfuric acid on Europa would quash any talk that life might exist there. "After all, even though we know there are acid-loving bacteria on Earth, sulfuric acid is a nasty chemical," he said.

"Although sulfur may seem like a harsh chemical, its presence on Europa doesn't in any way rule out the possibility of life," Neelson said. "In fact, to make energy, which is essential to life, you need fuel and something with which to burn it. Sulfur and sulfuric acid are known oxidants, or energy sources, for living things on Earth. These new findings encourage us to hunt for any possible links between the sulfur oxidants on Europa's surface and natural fuels produced from Europa's hot interior."

"These findings have helped solve a puzzle that has been nagging at me for a long time," Carlson said. "Data gathered by the spectrometer during observations of Europa had shown a chemical that we couldn't identify. I kept wondering, 'What the heck is this stuff?' Lab measurements now tell us that it is sulfuric acid, and we can start investigating where it comes from and what other materials might be there."

One theory proposed by Carlson is that the sulfur atoms originate with the volcanoes on Jupiter's fiery moon Io, with the material being ejected into the magnetic environment around Jupiter and eventually whirled toward Europa. Another idea is that the sulfuric acid comes from Europa's interior, beneath the moon's icy crust, ejected by sulfuric acid geysers or oozing up through cracks in the ice.

Another theory comes from Carlson's co-author, Professor Robert Johnson of the University of Virginia in Charlottesville, who noted that sodium and magnesium sulfates may have leached onto Europa's surface from underground oceans and then were altered by the intense radiation field.

More information on the Galileo mission is available on the World Wide Web at: <http://www.jpl.nasa.gov/galileo>



LVIS is in California

The Wallops C-130 departed Oct. 8 for a mission to map a 200-square mile forest area northeast of Fresno, Calif., in the Sierra Nevada Mountains. The instrument being used for the mapping is the Laser Vegetation Imaging Sensor (LVIS), built at the Goddard Space Flight Center.

The flights are a precursor to the launch of the Vegetation Canopy Lidar (VCL) satellite scheduled for launch in September 2000. VCL will create the first maps of the three-dimensional structure of vegetation in the world's forests.

The California flights will allow scientist to acquire VCL-like data that they will use to fine-tune their data analysis methods.

The C-130 is scheduled to make four flights over an area that contains semi-evergreen broad-leaved woodland and evergreen needle-leaved woodland. The target area begins about 20-miles north of Fresno and runs 60 miles to the southeast through the Sierra and Sequoia National Forests and Sequoia-Kings Canyon National Park.

Information available to forest managers on the structure of forests is very spotty- requiring labor intensive sampling from the ground. For the USDA Forest Service in California, such field collection is not practical for area the size of the Sierra Nevada. Thus, they are turning to lidar mapping for support.

The Forest Service will the University of Maryland VCL team in processing the new Sierra Nevada data by supplying new ground data from the areas mapped from the air. Once the LVIS maps are publicly available, Forest Service scientists plan to evaluate how well the maps meet their forest management needs for monitoring large forest areas.



Members of the Wallops Fire Department hosted students from Three Bears Day Care on Oct. 7 as part of Fire Prevention Week activities. Students learned the importance of fire safety, how to respond to fire emergencies and viewed equipment used by the firefighters.

Wallops Shorts..... Balloons Flight

An upper atmosphere research experiment was successfully flown on a NASA scientific balloon Oct. 3 from Ft. Sumner, NM. The nearly 7-hour mission was flown on a .3 million cubic meter balloon to a float altitude of 36 kilometers.

On the Road

Keith Koehler, Code 130, spoke to the Wicomico Rotary Club on Oct. 5 about current and future Wallops activities and the NASA budget.

Fire Department

The Wallops fire Department had a busy week Sep. 23 through 30 with 55 aircraft standbys, 7 fire alarms, and 1 ambulance call.

Monthly Weather Summary
by Jim Buchanan, Meteorologist

Thanks to Hurricane Floyd and an upper-level disturbance that followed a few days later, September was the wettest month of the year so far. As Floyd moved through eastern North Carolina on the 15th and then passed within 5-10 miles of Wallops on the 16th it dropped 5.29 inches of rain. The strongest winds from the storm for Wallops were actually on the backside, after the storm had passed, when we had northwest winds of 53 mph. The rain from Floyd was, of course, the big contributor to a monthly total of 9.76 inches. Normal rainfall for the month is 3.35 inches. Overall there were 12 days of measurable rainfall, with three of those days having greater than one inch of rain. Wallops has now received 35.21 inches of rain for the year, which is almost 5.5 inches above normal for this time of year.

Temperature-wise, there were no records set during the month, and the overall average was less than one-half degrees below normal. The warmest reading for the month was 84° on the 8th, and the coolest was 46° on the 23rd. There were actually two days, the 22nd and 30th, when the high did not reach 70°. The averages for the month were: high, 76.3°; low, 61.9°; total 69.1°. Normal averages are: high, 77.8°; low, 60.8°; total 69.3°.

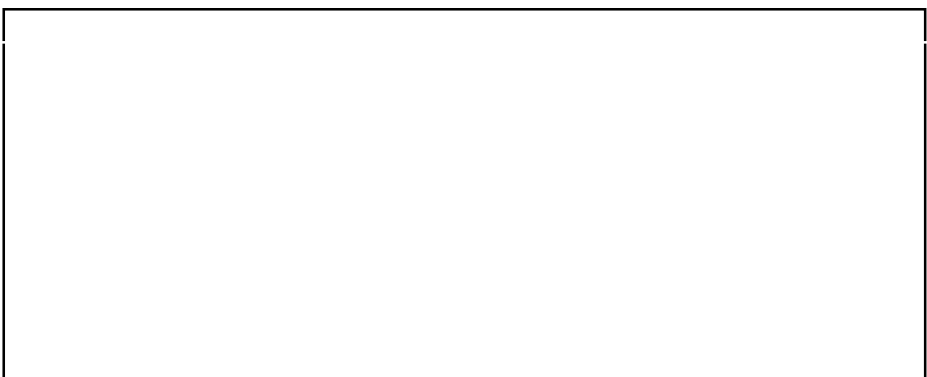
Looking ahead to November, the real chill of fall takes hold. By the middle of the month night time lows begin averaging less than 40°. The average low for the month is 40°, with a range from 49° to 33°. Daytime high average is 58.2°, with a range from 65° to 50°. The extreme temperatures for November are 83° on the 1st and 4th, and a low of 19° on the 16th, 24th, and 27th. November is normally one of our drier months, averaging only 2.89 inches of rain with eight days of measurable rainfall. We also begin to pick up a slight chance for snowfall, but on average there is less than one day of measurable snow during the month.

Don't get caught by the sudden approach of cold weather. Winterize vehicles and prepare home heating systems now for safe and efficient operation.

Organ Donor Leave

President Clinton has approved legislation that provides federal employees who become organ donors up to 30 days of paid leave, up from the previous limit of 7 days. The Organ Donor Leave Act reflects the consensus in the medical community that donors need more time to recuperate following surgery.

The next Thrift Savings Plan open season is Nov. 15 to Jan. 31.



Wallops Combined Federal Campaign Celebration
Sponsored by NASA, NAVY, and NOAA

October 14, 1999
11:00 a.m. - 1:00 p.m.
at the Softball Field

Celebration activities include:

- Fun Run/Walk (to participate, contact SCC Joseph Cady at x7087)
- Bake Sale
- 50/50 Raffle (drawing at 12:30)



Lunch, including chili cookoff competition, is at 11:30.
Cost is \$3.00.

Come out for FOOD, FUN, and FELLOWSHIP to show your support for the Wallops Combined Federal Campaign.

All proceeds to benefit the Combined Federal Campaign.



For more information, contact Tina Wessells at x 2110.

Special thanks to the Wallops Employee Morale Association and the Navy's Morale Welfare Recreation for the generous support provided.

RAIN DATE: October 21, 1999



The Wallops Flight Facility's new, advanced wastewater treatment plant has recently become operational. The plant, which supports both the Main Base and Wallops Island, is designed and legally permitted to treat and discharge domestic wastewater. The disposal of items other than domestic waste can have a detrimental effect on the biological treatment processes used in the new plant and adversely impact the environment. If you have any questions about what can be disposed of through the wastewater system, call the Environmental Team at x1103 or the Facility Management Branch at x1748.

Flu Shots

Shots for the influenza vaccine (flu) will be available at the Wallops Health Unit beginning Oct. 18. Call the Health Unit, x1266 to schedule and appointment.

Carpool Wanted: for Crisfield/Marion area. I would like to join one or form one. Call Mike Buck at 410-968-2193.

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